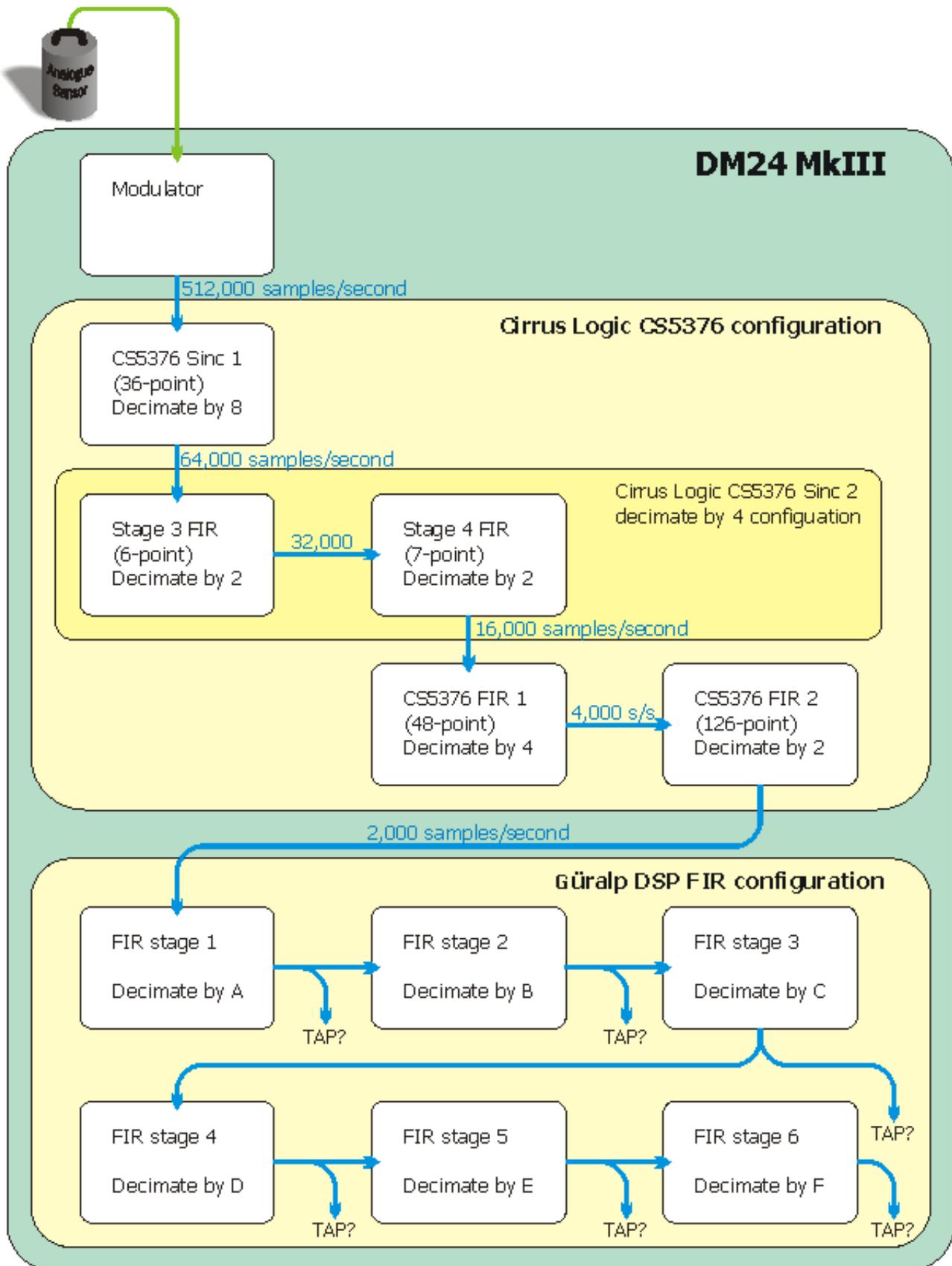




FIR filter configuration of the CMG-DM24 mk3

This information applies to most modular CMG-DM24 units and digital instruments manufactured after 2004.

The earlier model DM24 Mk2 has a different filter configuration.



Data from the modulator is decimated in stages down to 2000 Hz. This is dealt with by a

single Cirrus Logic (formerly Crystal) CS5376 unit.

- Coefficients for initial (Sinc 1) decimation by 8
- Coefficients for Sinc 2 stage 3 decimation by 2
- Coefficients for Sinc 2 stage 4 decimation by 2
- Coefficients for CS5376 FIR 1 decimation by 4
- Coefficients for CS5376 FIR 2 decimation by 2

After this, further FIR filters are used to decimate the data. The DM24 allows the user to select up to four simultaneous output rates, which the DM24 provides by selecting taps from between six configurable filter stages, each filter stage providing decimation ($\div 2$), ($\div 4$), ($\div 5$) as required. Decimation factors of 8 and 10 are produced by cascading filters ($\div 4, \div 2$) and ($\div 5, \div 2$) respectively.

- Coefficients for decimation by 2
- Coefficients for decimation by 4
- Coefficients for decimation by 5

Other information, such as bit weights (in $\mu\text{V}/\text{count}$), normalisation factor, and poles and zeros, can be found on the digitizer's calibration sheet.

Recent DM24 firmware sets the digitiser type field and tap table lookup value in the GCF header. This allows the sequence of filters to be determined from the GCF data itself.

- DM24mk3 decimation information
- DM24mk3 tap table

SWA-D24-3D00

Laurence Withers, 2007-09-28

DM24mk3 Decimation Information

ADC base rate: 512000Hz

- * [SWA-D24-3D01] coefficients for 36-point decimation by 8
- * [SWA-D24-3D02] coefficients for 6-point decimation by 2
- * [SWA-D24-3D03] coefficients for 7-point decimation by 2
- * [SWA-D24-3D04] coefficients for 48-point decimation by 4
- * [SWA-D24-3D05] coefficients for 126-point decimation by 2

Tap input rate: 2000Hz

- * [SWA-D24-3D06] coefficients for decimation by 2
- * [SWA-D24-3D07] coefficients for decimation by 4
- * [SWA-D24-3D08] coefficients for decimation by 5

To determine the sequence of decimation filters used in GCF data, take the TTL (tap table lookup) value from the GCF header, and the sample rate of the data, and refer to [SWA-D24-3D09]. The leftmost column is the TTL value. Then decimation factor and resulting sample rate are given for each tap.

TTL,Decimate0, Tap0,Decimate1, Tap1,Decimate2, Tap2,Decimate3, Tap3,Decimate4, Tap4,Decimate5, Tap5,Decimate6, Tap6

1,2,1000,2,500,2,250,2,125,5,25,5,5
2,2,1000,2,500,2,250,5,50,2,25,5,5
3,2,1000,2,500,2,250,5,50,5,10,2,5
4,2,1000,2,500,2,250,5,50,5,10,5,2
5,2,1000,2,500,4,125,5,25,5,5,5,1
6,2,1000,2,500,5,100,2,50,2,25,5,5
7,2,1000,2,500,5,100,2,50,5,10,2,5
8,2,1000,2,500,5,100,2,50,5,10,5,2
9,2,1000,2,500,5,100,4,25,5,5,5,1
10,2,1000,2,500,5,100,5,20,2,10,2,5
11,2,1000,2,500,5,100,5,20,2,10,5,2
12,2,1000,2,500,5,100,5,20,4,5,5,1
13,2,1000,2,500,5,100,5,20,5,4,2,2
14,2,1000,2,500,5,100,5,20,5,4,4,1
15,2,1000,4,250,2,125,5,25,5,5,5,1
16,2,1000,4,250,5,50,2,25,5,5,5,1
17,2,1000,4,250,5,50,5,10,2,5,5,1
18,2,1000,4,250,5,50,5,10,5,2,2,1
19,2,1000,5,200,2,100,2,50,2,25,5,5
20,2,1000,5,200,2,100,2,50,5,10,2,5
21,2,1000,5,200,2,100,2,50,5,10,5,2
22,2,1000,5,200,2,100,4,25,5,5,5,1
23,2,1000,5,200,2,100,5,20,2,10,2,5
24,2,1000,5,200,2,100,5,20,2,10,5,2
25,2,1000,5,200,2,100,5,20,4,5,5,1
26,2,1000,5,200,2,100,5,20,5,4,2,2
27,2,1000,5,200,2,100,5,20,5,4,4,1
28,2,1000,5,200,4,50,2,25,5,5,5,1
29,2,1000,5,200,4,50,5,10,2,5,5,1
30,2,1000,5,200,4,50,5,10,5,2,2,1
31,2,1000,5,200,5,40,2,20,2,10,2,5
32,2,1000,5,200,5,40,2,20,2,10,5,2
33,2,1000,5,200,5,40,2,20,4,5,5,1
34,2,1000,5,200,5,40,2,20,5,4,2,2
35,2,1000,5,200,5,40,2,20,5,4,4,1
36,2,1000,5,200,5,40,4,10,2,5,5,1
37,2,1000,5,200,5,40,4,10,5,2,2,1
38,2,1000,5,200,5,40,5,8,2,4,2,2
39,2,1000,5,200,5,40,5,8,2,4,4,1
40,2,1000,5,200,5,40,5,8,4,2,2,1
41,4,500,2,250,2,125,5,25,5,5,5,1
42,4,500,2,250,5,50,2,25,5,5,5,1
43,4,500,2,250,5,50,5,10,2,5,5,1
44,4,500,2,250,5,50,5,10,5,2,2,1
45,4,500,5,100,2,50,2,25,5,5,5,1
46,4,500,5,100,2,50,5,10,2,5,5,1
47,4,500,5,100,2,50,5,10,5,2,2,1
48,4,500,5,100,5,20,2,10,2,5,5,1
49,4,500,5,100,5,20,2,10,5,2,2,1
50,4,500,5,100,5,20,5,4,2,2,2,1
51,5,400,2,200,2,100,2,50,2,25,5,5
52,5,400,2,200,2,100,2,50,5,10,2,5
53,5,400,2,200,2,100,2,50,5,10,5,2
54,5,400,2,200,2,100,4,25,5,5,5,1

55,5,400,2,200,2,100,5,20,2,10,2,5
56,5,400,2,200,2,100,5,20,2,10,5,2
57,5,400,2,200,2,100,5,20,4,5,5,1
58,5,400,2,200,2,100,5,20,5,4,2,2
59,5,400,2,200,2,100,5,20,5,4,4,1
60,5,400,2,200,4,50,2,25,5,5,5,1
61,5,400,2,200,4,50,5,10,2,5,5,1
62,5,400,2,200,4,50,5,10,5,2,2,1
63,5,400,2,200,5,40,2,20,2,10,2,5
64,5,400,2,200,5,40,2,20,2,10,5,2
65,5,400,2,200,5,40,2,20,4,5,5,1
66,5,400,2,200,5,40,2,20,5,4,2,2
67,5,400,2,200,5,40,2,20,5,4,4,1
68,5,400,2,200,5,40,4,10,2,5,5,1
69,5,400,2,200,5,40,4,10,5,2,2,1
70,5,400,2,200,5,40,5,8,2,4,2,2
71,5,400,2,200,5,40,5,8,2,4,4,1
72,5,400,2,200,5,40,5,8,4,2,2,1
73,5,400,4,100,2,50,2,25,5,5,5,1
74,5,400,4,100,2,50,5,10,2,5,5,1
75,5,400,4,100,2,50,5,10,5,2,2,1
76,5,400,4,100,5,20,2,10,2,5,5,1
77,5,400,4,100,5,20,2,10,5,2,2,1
78,5,400,4,100,5,20,5,4,2,2,2,1
79,5,400,5,80,2,40,2,20,2,10,2,5
80,5,400,5,80,2,40,2,20,2,10,5,2
81,5,400,5,80,2,40,2,20,4,5,5,1
82,5,400,5,80,2,40,2,20,5,4,2,2
83,5,400,5,80,2,40,2,20,5,4,4,1
84,5,400,5,80,2,40,4,10,2,5,5,1
85,5,400,5,80,2,40,4,10,5,2,2,1
86,5,400,5,80,2,40,5,8,2,4,2,2
87,5,400,5,80,2,40,5,8,2,4,4,1
88,5,400,5,80,2,40,5,8,4,2,2,1
89,5,400,5,80,4,20,2,10,2,5,5,1
90,5,400,5,80,4,20,2,10,5,2,2,1
91,5,400,5,80,4,20,5,4,2,2,2,1
92,5,400,5,80,5,16,2,8,2,4,2,2
93,5,400,5,80,5,16,2,8,2,4,4,1
94,5,400,5,80,5,16,2,8,4,2,2,1
95,5,400,5,80,5,16,4,4,2,2,2,1